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EMPIRICAL TESTING OF CAPM IN SELECTED SECURITIES

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ABSTRACT

This paper focuses on empirical testing of CAPM, to measure the return on securities selected. The paper describing CAPM, empirical analysis of banking, FMCG, IT, Automobile, Pharmaceutical segments

KEYWORDS: Banking, CAPM, Empirical Testing, FMCG and Pharmaceutical Segments

INTRODUCTION

Portfolio is a bundle or a combination of individual assets or securities. The portfolio theory provides a normative approach to investors to make decisions to invest their wealth in assets or securities under risk. It is based on the assumption that investors are risk averse. This implies that investors hold well diversified portfolio instead of investing their entire wealth in a single or a few assets. One important conclusion of the portfolio theory is that if the investor of the portfolio theory is that if the investor holds a well diversified portfolio of assets, then their concerns should be the expected rather of return and risk of the portfolio, rather than individual assets and the contribution of individual assets to the portfolio risk.

The second assumption of the portfolio theory is that the returns of assets are normally distributed. This mean that the mean and variance analysis is the foundation of the portfolio decisions. Further, we can extend the portfolio to derive a framework for valuing risk assets. This framework is referred to a Capital Asset Pricing Model (CAPM).

Problem Statement

Earning maximum returns on investment is definitely the motto for any investor. Selecting stocks however, exclusively on the basis of maximization of return is not enough. The fact that most investors do not place their available funds in few stock promising higher returns suggests that other factors must be considered besides returns in selection process. Investors want to maximize expected return subject to their assessment and capacity to take risk. The risk associated with the holdings is that the return that is achieved will be less than the return that was expected. Hence, the study of risk vis-à-vis returns always holds a great significance, which immensely helps, in key decision making process.

Investors thus need to make decisions as to what securities should be held. Estimates need to be prepared of the return and risk associated with the securities for a certain period of time. This is known as security analysis and is built around the idea that investors are concerned with expected return and risk, the two principal properties inherent in

securities. Thus the return and risk and their measurement using CAPM will be the core of the study undertake. The attachment of the paramount importance of these two principal properties, return and risk, inherent in securities with the analysis of any investment decision make the study significant.

Objectives of the Study

- To measure the return on securities selected i.e FMCG, IT, Banking, Automobile and Pharmaceutical industries.

- To measure the systematic risk of the securities by using beta as a measure of risk

- To calculate expected rate of return using CAPM

- To evaluate the performance of stocks using CAPM model

Scope of the Study

- Scope segments of the economy such as shipping, textile are not considered for lack of sufficient data points and hence a few good performing companies were eliminated.

- The grouping of industries into segments varies among individuals. E.g HUL is considered as a FMCG. But since HUL Paints is a major wealth creating company.

- It is assumed that the firm selected is representative of the segment.

METHODOLOGY

Research Design: This study is based on empirical research methodology. Empirical research methods are a class of research methods in which Empirical observations or Data are collected in order to answer research question.

Sample Design Methodology

Selection of Companies: The economy was classified into segments as shown. In each of these segments a leading firm was selected. This firm is considered as a representative of the top performing firms in the segments.

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Table 1

Segment	Firm
Banking	SBI
FMCG	Hindustan Unilever Limited
IT	Infosys
Automobile	Maruthi Suzuki Limited
Pharmaceutical	Ranbaxy

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Overview of SBI Limited
Profile

State Bank of India is the largest state-owned banking and financial services company in India. State Bank of India was incorporated in the year 1955. The Bank provides banking services to the customer. In addition to the banking services, the Bank through their subsidiaries, provides a range of financial services, which include life insurance, merchant banking, mutual funds, credit card, factoring, securities trading, pension fund management and primary dealership in the money market. The Bank operates in four business segments, namely Treasury, Corporate/ Wholesale Banking, Retail Banking and Other Banking Business. India's largest bank is also home to the country's biggest and most powerful

treasury, contributing to a major chunk of the total turnover in the money and forex markets. Through a network of state of the art dealing rooms in India and abroad, backed by the assured expertise of informed professionals. The SBI extends round the clock support to clients in managing their forex and interest rate exposure.

SBI's relationship with over 700 correspondent banks is also leveraged in extracting maximum value from treasury operations SBI's treasury operation is channeled through the rupee treasury, the forex treasury and treasury management group.

Table 2: Overall SBI Returns Estimation for Year 2009-2013

Year	Return	Relative Return
2009	-0.47159	0.52841
2010	0.51869	1.51869
2011	0.16270	1.16270
2012	-0.45686	0.54314
2013	0.44119	1.44119
SBI Returns (%)		-6.09070

Source: SBI Annual reports

OVERVIEW OF RANBAXY

Company Profile

Ranbaxy Laboratories Limited (Ranbaxy) is a research based international pharmaceutical company serving customers in over 150 countries. For more than 50 years, we have been providing high quality, affordable medicines trusted by healthcare professionals and patients across geographies. **Established:** 1961, **Headquarters:** Gurgaon, Haryana, India, **Employees:** More than 14,000.

Ranbaxy laboratories limited (Ranbaxy), India's largest pharmaceuticals company, is an integrated, research based, international pharmaceutical company, producing wide range of quality, affordable generic medicines, trusted by healthcare professionals and patients across geographies. Ranbaxy today has the presence in 23 of the 2 pharmaceuticals markets of the world. The company has a global footprint in 43 countries, world class manufacturing facilities in 8 countries and serves customers in over 124 countries. We have ground operations in 43 countries and 16 manufacturing facilities spread across 8 countries. We cover all the top 25 pharmaceutical markets of the world and have a robust presence across both developed and emerging markets.

Table 3: Overall Ranbaxy Returns Estimation for Year 2009-2013

Year	Return	Relative Return
2009	-0.39482	0.60518
2010	1.00480	2.00480
2011	0.14037	1.14037
2012	-0.39421	0.60579
2013	0.24789	1.24789
Ranbaxy return (%)		0.90200

Source: Ranbaxy Laboratories Limited

Overview of Hindustan Lever Limited

HLL is India's largest fast moving consumer goods company, with leadership in home and personal care products and foods and beverages. HLL's brands, spread across 20 distinct consumer categories, touch the lives of two out of three Indians. They endow company with scale of combined volumes of about 4 million tones and sales of Rs. 10000 cores

That mission that inspires HLL's six thousand employees, including about 1340 mangers, is to "add vitality of life" with 34 power brands, HLL meets every day needs for nutrition, hygiene, and personal care with brands that help people feel good, look good and get more out of life.

The Company has over 16,000 employees and has an annual turnover of around Rs. 21,736 cores (Financial year 2012-13). HUL is a subsidiary of Unilever, one of the world's leading suppliers of fast moving consumer goods with strong local roots in more than 100 counties across the globe with annual sales of about €46.5 billion in 2013. Unilever has about 52% shareholding in HUL.

Table 4: Overall HUL Returns Estimation for Year 2009-2013

Year	Return	Relative Return
2009	0.14627	1.14627
2010	0.12817	1.12817
2011	0.16771	1.16771
2012	0.27041	1.27041
2013	0.27504	1.27504
HUL return (%)		19.5900

Source: HUL reports

Overview of Maruthi Suzuki Limited

Maruthi Suzuki India Limited (MSIL), a subsidiary of Suzuki motor corporation (SMC), Japan, is the leader in passenger cars (PC's) and multipurpose vehicles (MPVs) in India, accounting for nearly 50 percent of the total industry sales. The company is a subsidiary of Suzuki Motor Corporation of Japan. The company is engaged in the business of manufacturing, purchase of sale of motor vehicles and spare parts (automobiles). In 2009-10, the company sold 1,018,365 vehicles. This comprised 870,790 vehicles in the domestic market and 147,575 vehicles in export markets. Cumulatively, it has produced and sold over 8 million cars. Car market leader Maruthi Suzuki India Limited sold a total of 95,145 units in December 2012, a growth of 3.2 percent over December 2013 This includes 13,072 unit for export. The Company has sold a total of 92,161 units in December 2013.

Table 5: Overall MARUTHI SUZUKI Returns Estimation for Year 2009-2013

Year	Return	Relative Return
2009	-0.48218	0.51782
2010	1.84736	2.84736
2011	-0.12405	0.87595
2012	-0..35407	0.64593
2013	0.54527	1.54527
Maruthi Suzuki return (%)		5.2102

Source: MSIL

Overview of Infosys

Infosys Ltd is a global technology services firm that defines, designs and delivers information technology (IT) enabled business solutions to their clients. The company provides end-to-end business solutions that leverage technology for their clients, including technical consulting, design, development, product engineering, maintenance, systems integration package-enabled consulting, and implementation and infrastructure management services. The company is having marketing and technical alliance with File Net, IBM, Intel, Microsoft, Oracle and System Application products. Infosys Ltd is a public limited and India's second largest software exporter company was incorporated in the year 1981 as Infosys Consultants Pvt Ltd by Mr. N. R. Narayana Murthy at Karnataka. The company was started by seven people with

the investment of USD 250. The company became a public limited company in the year 1992. The company was the first Indian company to be listed on the NASDAQ at the year 1999.

Table 6: Overall Infosys Returns Estimation for Year 2009-2013

Year	Return	Relative Return
2009	-0.39768	0.60232
2010	1.27073	2.27073
2011	0.30717	1.30717
2012	-0.22944	0.77056
2013	-0.13265	0.86735
Infosys return (%)		3.6251

Source: Infosys reports

SUMMARY OF FINDINGS

Summary

The Capital Asset Pricing Model, or CAPM is a theory of the relationship between risk and return and explains how financial assets are priced under certain conditions. The standard deviation of a security's returns is a measure of the total risk of that security. According to CAPM, however, standard deviation is not the relevant measure of a security's risk, because part of the total risk is eliminated by diversification. Only that part of risk that remains after diversifying is important to diversified investors. The required rate of return on a stock is determined by individual investors after considering other investment opportunities (market conditions) and the stock's risk. According to CAPM, this is expressed in the following equation, which is the formula for the Security Market Line (SML).

$Ri = rf + \beta i (Rm - rf)$

Where Ri = required rate of return on stock i

rf = risk free interest rate

βi = beta of stock i

Rm = expected return on the market

For stocks that are in equilibrium, the return indicated by CAPM represents both the required rate of return and the expected return. If the stock market is efficient, stock prices tend to be in some stocks might be undervalued and others might be overvalues at a particular time, on average, market prices are probably close to intrinsic values.

Table 7

Aggressive stocks	Defensive Stocks
SBI	HUL
Ranbaxy	Maruthi Suzuki
	Infosys

CONCLUSIONS AND SUGGESTIONS

Conclusions

This paper examined the validity of the CAPM for the selected stocks of National Stock Exchange. The study used monthly stock returns from five selected companies listed on the NSE from 1.1.2009 to 31.12.2013. In our analysis of Capital Asset Pricing Model, we analyze the pricing of the tocks using this model. As we know that the unsystematic risk

can be eliminated by the diversification, the only risk to be accounted is the systematic risk. In order to consider the systematic risk for analysis we have taked the CAPM.

The direct relationship between a security's expected return & its 'β' is called the security Market Line (SML). The Security Market Line is thus plotted with the expected return got by CAPM. The CAPM states that the expected return on a security above that of the risk-free rates equals the security's 'β' multiplied by the expected excess return on the market by which the expected return is the linear function of its 'β'. All said there are two points that is always present for the plot of the graph, the one is the zero 'β' and the other of the value of 'β' which is equal to zero is the risk-free rate and the market value of 'β' is the 'β' equal to one. Both the points are used to plot the SML. The CAPM states that the expected return increases with increase in the risk. The Regression model used will only define how good is the data for analysis when considered for the stock and market return. The best is the one which is neat to one as the dependent data is suitably explained by the independent data by coefficient of determination.

The 'β' forming the linear relationship of the CAPM equation define the stock variation with that of the market. The market model is place of the expected return is given the return based on the past price behavior. The important point here is that the market model does not account for the risk bearing of the investor accordingly the equation does not include any notation which gives the proper bearing of risk bearing of investors. The market model only gives the measure the stock return on the historical data, but he question is still remains as to what should be the investor return on the future date of he/she is ready to bear the risk for any price fall. The answer for this is provided by incorporating or taking into account the risk free rate.

The market model is an export model, which means it describes past portfolio price behavior. The CAPMs model is an exante model, which means it predicts which the portfolio value should be.

Suggestions

In empirically testing of CAPM, it cannot be fully rejected since the market index used in this test is surely not the "Market portfolio" of what CAPM says. And the securities' beats use are all estimated betas and to the true betas.

As pointed out in the literature survey, one of the shortcomings of any ex-post test of CAPM is the difficulty in defining the market portfolio. The assumptions of CAPM imply that the market portfolio reflects the universally preferred combination of risky assets. The market portfolio in CAPM should ideally include all assets. Naturally, for testing purposes only a reasonable proxy for the market portfolio has to be used. Thus, if the market proxy is not properly defined tests of CAPM may give misleading results.

Moreover the efficient market assumptions behind CAPM is likely to be less valid in India compared to the developed country market, where the securities trading is much more efficient in terms of greater transparency in transaction, faster and easier availability of information related to the market, shorter settlement periods, less transaction cost, greater liquidity and depth of the market, etc. Insider trading is believed to be rampant in the Indian market. The lack of transparency in the trading system facilities insider trading. Earlier there was virtually no law against insider trading. After SEBI was formed, it has taken several steps to protect the small investors and prevent insider trading. In specific cases it can carryout investigations on alleged insider trading. Greater transparency in transaction will make insider trading more difficult to hide.

The only factor consider for the model is beta. The influence of other factors are not considered for analysis, this

has however lead to question the validity of the model as the significant effects of the price variation and the company policies which play a vital role as the new information in the market is not considered for the analysis. Factors like size, various ratios and price momentum provide cases of diversions from the model's premise. This ignores too many other asset classes to be considered a viable option.

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